



The University of Montana College of Technology Hydrogen Education Program

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Objectives

- **The overall objective is to develop educational programs and facilities for training energy technicians with an emphasis on hydrogen technologies**
 - **Develop an Energy Technician's Curriculum**
 - **Develop a Hydrogen Safety Center**
 - **Establish an Educational/Interactive Web Site**
 - **Plan for the Montana Hydrogen Futures Program**



Education

**“Education crosscuts all of the
Hydrogen, Fuel Cells &
Infrastructure Technologies
Program Components”**

—HFCIT 6/03/03



Objectives

- **College Curriculum – Energy Engineers and Technicians**
 - Work with DOE to Develop and Make Available a Complete **Alternative Energy Curriculum**
 - 1, 2, and 4 Year Programs that Provide Hydrogen Workforce Infrastructure
 - Training for Potential End-Users
 - Training of the Labor Force



Objectives

- **College Curriculum – Energy Engineers and Technicians**
 - *Aim:*
 - Provide traditional, non-traditional, and hands-on training for hydrogen and alternative energy (wind, solar, biomass)
 - Energy professionals
 - Lay persons
 - Business entrepreneurs
 - Government Agencies
 - Organizations



Objectives

- **Hydrogen Safety Center**
 - **Establish world class hydrogen safety training and education**
 - **Provide focal point for educational transfer of information and communication**
 - **Based on input from national professionals, DOE labs, energy leaders, academic faculty and staff (MT Tech, UM), energy leaders, and safety training providers**



Objectives

- **Develop a Hydrogen Futures information and educational web site**
 - **Support growth and development of hydrogen technologies**
 - **Create a digital and hard copy library**
 - **Provide an interactive information clearinghouse concerning the use of hydrogen and fuel cell technologies:**
 - **Clearly communicate**
 - **Benefits and Challenges**
 - **Safety Issues**
 - **Economics (Market Introduction)**
 - **Research (Status, Requirements)**
 - **Education (Understanding)**



Objectives

- **Planning for the UM/COT Hydrogen Futures Program**
 - **Identify programs and facilities needed to assist and support:**
 - DOE and DOE laboratories
 - Government agencies
 - Teachers and Students
 - Large-scale end users
 - Energy industry
 - Businesses
 - Public



Budget

- **Total Funding for the Project**
 - **\$ 735, 807 - 12 Month**
 - **Project Period**
 - **~ June 1, 2004-May 30, 2004**
- **New Project**
 - **Not yet started**



Technical Barriers & Targets

- **The hydrogen economy is a revolutionary change**
 - **People are hesitant or resistant to change**
 - **High degree of comfort with using gasoline**
- **Education is essential**
 - **Trained Work Force**
 - **Public Awareness/Understanding**



Technical Barriers & Targets

- **Lack of awareness**
 - Result in little incentive to change
- **Lack of Experience**
 - Real world, hands on enhances understanding and comfort
- **Institutional Barriers**
 - Need to identify and reach intended audiences
- **Regional Differences**
 - What applies to one, any not apply to another

Technical Barriers & Targets

- **Safe Practices are Essential**
 - **Can't afford catastrophic failure**
 - **Irreparable harm to hydrogen future**





Technical Barriers & Targets

- **Safety Information and Training**
 - Access to proprietary data
 - Find up to date/validated data
 - Obtain industry consensus
 - Address liability issues
 - Lack of reporting requirements for safety incidents
 - Lack of standards and protocols
 - Lack of technical and scientific understanding of hydrogen systems
 - Address QA and expense of data collection and management

HFCIT 6/03/03



Approach

- **Identify audience/end-user needs**
 - **Develop activities and materials**
 - **Test activities (curriculum, safety, web)**
 - **Revise Activities**
 - **Implement programs**
 - **Assess results**
 - **Obtain feedback from stakeholders and audiences**



Approach

- **Messaging is important**
 - **Communicate**
 - **Benefits of hydrogen and fuel cell technologies**
 - **Technical challenges ahead**
 - **Important research, development, and demonstration (RD&D) needed for successful commercialization**
 - **Safety awareness**
 - **Timeframe for mass market introduction**



Approach

- **Obtain stakeholder input**
 - **DOE Programs**
 - **DOE Laboratories**
 - **Industry**
 - **Government**
 - **Non-government organizations**
 - **Universities**



Timeline

- **Timeline**

	H2 Safety	Curric.	Web	Future Prg
Aug- Dec	ID Eq/Trng	ID Cs	ID Cont	Arch
Jan- Mar	Est Log	St Ap	Outline	Prog PI
Apr- Jun	Schedule	Dev.	Dev.	Fac
July Sept	Offer	Offer	Set up	Plan Comp



Technical Accomplishments/Programs

- **Component Identification/Planning**
 - **Technical program elements**
 - **Safety program technical requirements**
 - **Curriculum demands on Equipment for Training**



Interactions/Collaborations

- **MT Tech – Butte**
- **INNL – Idaho Falls**
- **Hydrogen Safety Inc.**
- **Pacific Northwest Labs**
- **NREL**